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SCIENTIFIC-TECHNICAL SESSION ON PROTECTIVE RELAYING

Engr Ye. D. Sapir

A scientific technical session on protective relaying, organized by the MEP (Ministry of the Electrical Industry USSR) and the Gor'kiy Division of VNITOE (All-Union Scientific and Technical Society of Power Engineers), was held in Cheboksary in October 1950. Present were 120 delegates from electric power systems, scientific-research and planning organizations, higher educational institutes, plants of the MEP, and also from the technical administrations of the MES (Ministry of Electric Power Stations USSR) and the MEP.

The session was opened by A. I. Yakunin, director of an MEP plant. N. N. Nikitin, secretary of the Chuvash Chlast Committee of the VKP(b) offered greetings for the oblast committee and expressed his confidence that the session would help plants to improve the quality of their relay equipment and to approach solution of important tasks in relay construction with the development of the new, gigantic electric power stations.

In his report, Engineer A. V. Buyvolov of an MEP plant pointed out that there has recently been a considerable expansion in the nomenclature of relays produced by the Soviet electric industry, and that due to the creative cooperation between the plants and the laboratories of TEP (State Trust for Electric Power Planning) and TsNIEL (Central Scientific-Research Electrical Engineering Laboratory) of MES, the relay-protection equipment produced is better than similar equipment built by foreign enterprises.

Engineer M. P Tsfasman of an MEP plant emphasized the improvement in the quality of relay equipment, and pointed out increased cooperation between plants and the consumer organizations would also bring further improvements in quality.

Engineer Ye. D. Zeylidzon (Technical Administration of MES) submitted a report on "Operating Experience With Relays and Demands Made by Electric Power Enterprises on the Electrical Industry in the Field of Relay Construction."

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other reports on this subject were delivered by Engineers N. V. Chernobrovov, Mosenergo (Moscow Regional Electric Power Aiministration); V. S. Benin, Lenenergo; A A Voskresenskiy, Gorenergo; and M. M. Feyermark, Glavelektromontaszh (Mein Administration of Electrical Installations). It was shown that the percentage of proper functioning of protective relaying equipment had increased from car to year. Cases of defective operation of such equipment, when the fault of the plants, will be corrected in the very near future. A number of practical suggestions in this direction were contributed by the following participants in the debates: Engineers F. F. Deryugin, Chelyabenergo; Ye. S. Gaba, Dontassenergo; D. T. Sergeyev, Mosenergo; S. Ye. Kashprovskiy, Kievenrgo; O A. Cil'cher, TsIEM (Central Laboratory of Electrical Installations), Mosconergo: V M. Yermolenko, TEP; A. T. Daurova, VVS (High-Voltage Network), Mosenergo; and Professor I. I. Solov'yov, TsNIEL. They urged the MEP to help the relev-building enterprises in matters of equipment and personnel.

Six papers were devoted to new Soviet developments in the field of protective relaying. Candidate in Technical Science M. I. Tsarev (TSNIEL) presented a report on "New Efforts in the Field of Differential Protection of Generator - and Transformers." The basic causes for faulty operation of this type of projection are transient processes in current transformers and magnetring current surges of power transformers on voltage recovery, following the discourse tion of an external short circuit. As the result of theoretical and apperimental research in TSNIEL of MES, a simple differential protection, using rapri-raturation current transformers, was developed for transformers, sencrators, and bus bars of high-voltage substations. The relay laboratories of TEP and TaleM, Mosenergo, have developed differential protection relays for two-winding transformers, in which rapid-saturation current transformers (BNT) operate is conjunction with restraining coils, resulting in differential protection of high tensitivity. Engineer G. T. Grek, of TEP, reported on work in the selection of optimum parameters for rapid-saturation current transformers; Engineer C A Gilicher (TsLEM, Mosenergo) spoke on relays with rapid-saturation carten* transformers for sensitive differential protection of two-winding transfermers produced in Mosenergo.

Professor 1. 1 Solov'yev of TSNIEL, read a paper on "Automatic Repeated Recloring," in which he brought out the following: Automatic repeated reclosing of transmission lines is an effective measure for raising the dependability of electric power supply. Every automatic repeated reclosing unit prevents one breakdown per year on the average. In circuit breakers with remote switching, automatic repeated reclosing units with automatic return to the position of readiness for the next operation should be used. In circuit breakers which are not remotely controlled, mechanical automatic repeated reclosing units should be employed. The MEP should organize mass production of mechanical automatic repeated reclosing units. Solov'yev also gave the technical characteristics of an lectrical automatic repeated reclosing unit developed by the TaNIEL and accepted for production by the electrical industry. He also emphasized the high efficiency of phase-by-phase automatic repeated reclosing in electric power systems Engineer P. K. Feyst, of TsNIEL, presented a paper on a selective device developed for phase-by-phase automatic repeated reclosing with balanced relays having minimum total resistance.

Candidate in Technical Science A. M. Bresler of an MEP plant spoke on "Distance-Relay Protection of Transmission Lines" and reported on distance relays already in use as Relay PZ-151 for lines with low ground currents, and Relay PZ-155 for lines with sizable ground currents. The development of a distance-protection circuit against single-phase short circuits in systems with a floating neutral has been completed.

In his paper, Professor G. I. Atabekov, Doctor of Technical Science of Taniel, suggested distance relay protection for medium-haul lines against interphase short circuits by the use of a quadruple-relay system and protection

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against ground faults by the use of a single-relay system. Such protection is suitable both for systems with three-phase interruption and systems with interruption by phases. Gruzenergo (Georgian Electric Power Administration) has had favorable operating experience with the protection method suggested.

Engineer A. D. Shleyfman, of TsLEM. Mosenergo, discussed two types of distance relays developed in Mosenergo for long, heavily loaded lines.

Engineer Ye. D. Zeylidzon (Technical Administration of MES) in a second paper, entitled "Protection of Generators Against Grounding," showed that the artificial establishment of active grounding currents for protective purposes reduced the reliability of systems supplied from the generator. New Soviet grounding protection equipment affords protection using only low grounding grounding protection equipment affords protection using only low grounding currents and makes it possible to compensate for high capacitive currents in the system. A decision was made by the Technical Administration of MES not to act on the climination of grounding protection in generator-voltage systems and for generators with small capacitive grounding currents.

Candidate in Technical Science Ya. M. Smorodinskiy, of TEP, presented a paper on "High-Frequency Protection of Transmission Lines." He discussed the latest high-frequency protection equipment developed in the USSR, which is based on symmetrical current and voltage components. Engineers Ye. D. Sapir, of TeNIEL, and O. A. Giltcher, of TaleM. reported on the results of operation of high-frequency, phase-differential protection developed by Taniel. Candidate in Technical Science I. N. Popov told of the work done by Taniel in the field of inertialess, directional, reverse-sequence, high-frequency protection.

Engineer A. S. Tulin, of an MEP plant, presented a paper on "New Relay Designs," discussing particularly the differential protection of three-winding transformers through the use of rapid-saturation current transformers having triple-rod cores

The following took part in the discussions of a paper on new Soviet developments in the field of relay protection: Engineer A. B. Barzam, Gavtsentrenergo (Main Administration of the Central Electric Power System); Engineer A. M. Yaroslavtev, Sverdlovenergo; Candidate in Technical Science A. M. Bresler, of Yaroslavtev, Sverdlovenergo; Candidate in Technical Science A. M. Bresler, of an MEP plant; Engineer A. A. Voskresenskiy, Gorenergo; Engineer Yu. A. Gayevenko, TEF; Engineer Ye. V. Varlamov, Lenenergo; Engineer M. M. Bogina, TsNIEL; Engineer M. S. Prokunin, Technical Administration of MEP; and Engineer N. V. Chernobrovev, Mosenergo.

Candidate in Technical Science I. A. Syromyatnikov (Technical Administration of MES) mentioned a number of problems of importance in the operation of relay protection and automatic devices. He pointed out that automatic field strength control should be introduced in all generators, and all suspension lines should be equipped with automatic repeated reclosing. Further, Syromylines should be equipped with automatic repeated reclosing. Further, Syromylines should be used more widely as protection based on the through of power stations should be used more widely as protection based on the through ac in high-voltage systems. The development of gigantic hydroelectric power stations will require great collaborative efforts on the part of scientific-research, planning and operational organizations, and the plants of the MEP.

Resolutions adopted by the session dealt with methods for further improvement of relay equipment, and recommendations were made for a broadening of the nomenclature of relays and complete protective units in production.

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